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SYSTEMS AND METHOD FOR REMOTE MANAGEMENT OF PRINTING DEVICES

INVENTOR(S):

James E. Obert
Letty B. Nutt
William A. Cox

SYSTEMS AND METHOD FOR REMOTE MANAGEMENT OF PRINTING DEVICES

TECHNICAL FIELD

The systems and methods for remote management of printing devices described herein relates to accessing and controlling network printing devices from a remote location. More specifically, the described implementations relate to third party access and control of workstation printing devices that are connected to the workstation by a network interface or by a direct connection such as USB or a parallel port.

BACKGROUND

Distributed networks that include several printing devices pose a logistical problem for managing and maintaining the printing devices so that down time is minimized. Problems in discovering faults that occur in printing devices and communicating information about these faults to maintenance technicians increase in proportion to the number of printing devices on the network or workstation and the physical distance between printing devices and/or between the printing devices and the maintenance technicians.

Printing device management solutions tend to focus primarily on management of network printers that reside on large company enterprises. These tools typically gather status information for the network printing devices on the enterprise-wide network, such as a local area network.

In addition, such solutions typically require large binary files to be installed on each personal computer or server within the enterprise. This, in itself, causes support issues when upgrades to management software are released.

A significant problem with current printing device management solutions is that, while they can gather information from printing devices connected to the network, they cannot access a printing device that is directly connected to a workstation computer through, for example, a Universal Serial Bus (USB) port or a parallel port. Furthermore, local area network solutions do not allow for remote, cross-firewall discovery and connection to network printers by third party service providers. Third party service providers are also unable to view printing device data and use management tools from outside of the enterprise firewall at the same time that another third party user or a user on the local area network accesses the data.

SUMMARY

The systems and methods for remote management of printing devices described herein allow a maintenance organization that is not affiliated with an enterprise or the enterprise equipment to perform remote diagnostics or get diagnostic data from enterprise equipment, including enterprise printing devices. Such access allows a maintenance technician to gain an understanding of the state of the equipment before making a service call. This will help the maintenance technician fix equipment problems more quickly and more accurately.

In one described implementation, printing devices that are directly connected to a workstation computer through, for example, a USB (Universal Serial Bus) port or a parallel port, can be accessed through a customer's local area network or remotely through the Internet. This is in addition to providing access to network printing devices.

One advantage provided by the described implementations is that the software that provides the content that is visible to a third-party service provider is stored outside of the customer's enterprise. Therefore, when this software requires updating, it is not necessary to upgrade software applications on multiple workstation computers; the update is only applied to the software at the service provider's site.

BRIEF DESCRIPTION OF THE DRAWINGS

A more complete understanding of exemplary methods and arrangements of the present invention may be had by reference to the following detailed description when taken in conjunction with the accompanying drawings wherein:

Fig. 1 is an illustration of a distributed computing environment including a local area network, a wide area network and a remote system.

Fig. 2 is a block diagram of the distributed computing environment illustrated in Fig. 1.

Fig. 3 is a flow diagram depicting a method for managing workstation printing devices from a remote location.

Fig. 4 is an illustration of a display page of a user interface for a printer information management system according to one embodiment of the invention.

DETAILED DESCRIPTION

The invention is illustrated in the drawings as being implemented in a suitable computing environment. Although not required, the invention will be described in the general context of computer-executable instructions, such as program modules, to be executed by a computing device, such as a personal computer or a hand-held computer or electronic device. Generally, program modules include routines, programs, objects, components, data structures, etc., that perform particular tasks or implement particular abstract data types. Moreover, those skilled in the art will appreciate that the invention may be practiced with other computer system configurations, including multi-processor systems, microprocessor-based or programmable consumer electronics, network PCs, minicomputers, mainframe computers, and the like. The invention may also be practiced in distributed computing environments where tasks are performed by remote processing devices that are linked through a communications network. In a distributed computing environment, program modules may be located in both local and remote memory storage devices.

General reference is made herein to one or more printing devices. As used herein, "printing device" means any electronic device having data communications and data storage capabilities, and functions to render printed characters on a print medium. The term "printing device" includes, but is not limited to, printers, copiers, facsimile machines and plotters. The term "printer" includes, but is not limited to, laser printers, ink jet printers, dot matrix printers, dry medium printers and the like. Although specific examples may refer to one or more of these printing devices, such examples are not meant to limit the scope of the claims or

the description, but are meant to provide a specific understanding of the described implementations.

Fig. 1 depicts a distributed computing environment 100 that includes a local area network 102. The local area network 102 includes a customer workstation cluster 104 and a printer cluster 106. The customer workstation cluster 104 has four workstation computers 108, 110, 112, 114. Although the customer workstation cluster 104 is shown as having four workstation computers 108-114, it is noted that the customer workstation cluster 104 may include from one to any practical number of workstation computers.

The printer cluster 106 includes three printers 116, 118, 120. Although the printer cluster 106 is shown as having three printers 116-120, it is noted that the printer cluster 106 may have from one to any practical number of printing devices. Each printer 116-120 in the printer cluster 106 communicates with one or more of the workstation computers 108-114 through a connection 122 that may be a network connection or a direct connection. As used herein, direct connection means, but is not limited to, a USB connection or a parallel port connection. A printer that is connected to a USB port or a parallel port of a workstation computer is referred to as a "local" printer for the workstation computer. For discussion purposes, printer 116 is connected to a USB port of workstation computer 114, printer 118 is directly connected to the local area network 102, and printer 120 is connected to a parallel port of workstation computer 110.

The distributed computing environment also includes a customer ISP (Internet Service Provider) server 124 that is connected to the Internet 126. The customer ISP server 124 provides Internet service to the local area network 102 through an Internet connection 128. Specifically, one of the workstation

computers 108-114 communicates with the customer ISP server 124 to establish the Internet connection 128. For discussion purposes, assume that workstation computer 108 establishes the Internet connection 128 with the customer ISP server 124. The other workstation computers 110-114 are provided with Internet service via the local area network 102 connection with workstation computer 108.

The distributed computing environment 100 also includes a remote diagnostics center (RDC) server 130 that communicates with the Internet 126. A remote diagnostics center (RDC) computer 132 communicates with the Internet 126 via an Internet connection 134 with the RDC server 130.

Fig. 2 is a block diagram of the distributed computing environment 100 shown in Fig. 1. Workstation computer 108 includes a display 200, a network interface card 202 to provide network connections and memory 204. A printer information management system component 206 is stored in the memory 204.

Workstation computer 110 includes a display 208, a network interface card 210, a parallel port 211, and memory 212 having a printer information management system component 214 stored therein. Workstation computer 112 includes a display 216, a network interface card 218 and memory 220 having a printer information management system component 222 stored therein.

Workstation computer 114 includes a printer information management component 224 stored in memory 226, a display 228 and a network interface card 230. A USB port 232 is also included in workstation computer 114. Printer 116 is connected to the USB port 232 of workstation computer 114. Printer 116 includes memory 234 having a diagnostic module 236 stored therein.

Printer 118 includes memory 238 in which a diagnostics module 240 is stored. Printer 118 is connected to the local area network 102. Printer 120

includes a diagnostics module 242 stored in memory 244. Printer 120 is connected to the local area network 102 via the parallel port 211 of workstation computer 110.

The remote diagnostics center server 130 hosts a remote diagnostics center website 246. A printer information management system 248 is located at the remote diagnostics center website. The remote diagnostics center computer 132 includes a display 250, a network interface card 252 and memory 254. A printer information management system component 256 is stored in the memory 254.

The printer information management system 248 that is located at the remote diagnostics center website 240 and the printer information management system components located in various other system devices will be discussed in greater detail below. It is noted that the printer information management system 248 is the largest portion of the software that implements the present invention. The printer information management system components are much smaller software modules that are used to access local data and provide the local data to the printer information management system 248, where the printing devices are centrally managed.

Fig. 3 is a flow diagram outlining a method for managing workstation printing devices, including printing devices connected to a workstation computer via a parallel port, from a remote location. At step 300, a customer identifies a problem with a printer 116-120 (printer 116 for this example). The diagnostics module 236 that operates within printer 116 initially identifies a problem with the printer 116 and provides an indication of the problem to the customer. This indication may be provided in the form of a printout or may be an error message

displayed by the printer 116. The indication may also be an electronic signal propagated by the printer 116.

The customer then accesses the printer information management system 248 on the remote diagnostic center server 130 using one of the workstation computers 108-114 (step 302). For discussion purposes, workstation computer 108 is used to access the RDC server 130. At step 304, a determination is made as to whether the workstation computer 108 has the printer information management system component 206 stored in the memory 204 of the workstation computer 108. If the printer information management system component 206 is not stored in the memory 204 ("No" branch, step 304), then the printer information management system component 206 is downloaded from the remote diagnostics center website 246 at step 306.

If - as in the present example - the printer information management system component 206 is present in the memory 204 ("Yes" branch, step 304), then step 306 is omitted and processing continues. A user interface is displayed when the printer information management system component 206 begins execution. The remainder of Fig. 3 will be discussed below, after the user interface is described in more detail.

Fig. 4 is an illustration of a display page of a user interface of the printer information management system, showing the location and identification information received by the workstation computer 108 at step 310. Fig. 4 includes a monitor 400 within which a display 402 is situated. The printer information is shown on the display 402 in the form of a location/id table 404. The location/id table 404 includes a host column 406, which indicates the host of each printer. A host can be any workstation computer 108-114 to which a printing device is

connected through a parallel port, or it can be the network 102 if a printing device is connected to the network 102.

The location/id table 404 also includes a printer name column 408. The printer name column lists a network name of a printer, the network name for a printer uniquely identifying the printer within the network. The location/id table 404 further includes a model column 410. The model column 410 includes a manufacturer name for a printer. The name displayed in the model column 410 informs a maintenance technician of the model of the printer, so that the maintenance technician can locate parts and supplies for that particular model.

The location/id table 404 also includes a port column 412. The port column 412 indicates a network address for each network-connected printer, or a parallel port identifier for each parallel-connected printer.

The location/id table 404 identifies the printers 116-120 that are present on the local area network 102. Workstation computer 114 hosts printer 116, which in this example, is an InkJet 312 model. Printer 116 is locally connected to workstation computer 114 through the USB port 230 of workstation computer 114, which is designated as LPT1 in the port column 412.

Workstation computer 112 hosts printer 118, which in this example, is a LaserJet 5P model. Printer 118 is network-connected, so a port address of 15.39.1.1 is shown in the port column 412. Workstation computer 110 hosts printer 120, which is a DeskJet 920 model. Printer 120 is connected via parallel port 211 of workstation computer 110 that has a network address of 15.39.3.5, as shown in the port column 412.

Printer 120 is a network printer, so it also shows up in another entry in the location/id table 404 with the same information in the printer name column 408,

the model column 410 and the port column 412. However, the host column 406 indicates that printer 120 is also hosted by the network 102.

The display 402 shown in Fig. 4 also includes a locate printers button 414 and a share window button 416. When the user interface initially appears, the location/id table 404 is blank. At step 308, a user activates the locate printer button 414 on the display 402. The printer information management system component 206 of workstation computer 108 (the computer on which the user is working) pings the local area network 102 and identifies all other printer information management system components on the network as well as directly pinging any network printers it can find on the network. It is noted that any workstation computer 108-114 that has a directly connected printing device will have a printing information management component stored in its memory.

The network-connected printers and the directly-connected printers respond to the inquiry from workstation computer 108 with a printer name, printer model, and a port number to which the responding printer is connected (step 310). The information regarding location and identification of each printer is then displayed to the user.

If the user wants a third-party to access the same information shown on the display 402, then the user activates the share window button 416 at step 314. Activation of the share window button 416 allows one or more third parties to view otherwise private information regarding the network printing devices. The user can then relinquish control of the diagnostics to the third party, or the user may concurrently access the diagnostics with the third party. Any party accessing the diagnostics program can then view status information, change printer settings,

run diagnostics, etc. using the printer information management system 248 (step 316).

Once the third-party diagnostician has control of the application, he or she can access the printer via normal network protocols such as TCP/IP, parallel port protocols such as Multiple Logical Channels (MLC) or IEEE 1284.4, or any other network or direct connection protocol.

In one implementation, fees for the service can be charged by the third-party to the user. The third-party may charge fees based on a fixed-cost contractual agreement with the user, or the third-party may charge a fee to the user each time the user accessed the printer information management system 348 on the remote diagnostics center website 246.

Conclusion

The described implementations advantageously provide for remote management of local area network printers. The local area network printers can be connected to the network or they can be directly connected to a workstation computer, via a USB port, a parallel port, or a similar direct connection port. When the printers have been located, a local user can share the printer information with a third-party service provider located outside the local area network. The user may relinquish control of the diagnostic software to the third party, or the user may share simultaneous access to the diagnostic software with the third party. The described implementations also provide for a more convenient fee system that can be controlled by the third party service provider.

Although the invention has been described in language specific to structural features and/or methodological steps, it is to be understood that the invention defined in the appended claims is not necessarily limited to the specific features or steps described. Rather, the specific features and steps are disclosed as preferred forms of implementing the claimed invention.